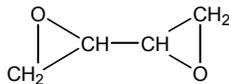


DIEPOXYBUTANE

CAS No. 1464-53-5

First Listed in the *Third Annual Report on Carcinogens*



CARCINOGENICITY

Diepoxybutane is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (IARC 1982, 1999). Two forms of 1,2:3,4-diepoxybutane (*D,L*- and *meso*-) applied dermally, induced skin papillomas and squamous cell carcinomas in mice. The *D,L*-racemic mixture also induced local fibrosarcomas in female mice and female rats by subcutaneous injection. When administered by intraperitoneal injection, *L*-diepoxybutane increased the incidence of lung tumors in mice of both sexes (IARC 1976).

No adequate data were available to evaluate the carcinogenicity of diepoxybutane in humans (IARC 1976).

PROPERTIES

Diepoxybutane is a colorless liquid that is miscible with water (IARC 1999). In water, it hydrolyzes to form 1,2,3,4-tetrahydroxybutane. Diepoxybutane is highly flammable and vapors may form explosive mixtures with air. Fires may produce irritating, corrosive, and toxic gases (HSDB 2000). Diepoxybutane occurs in several forms including *D,L*-1,2:3,4-diepoxybutane (CAS No. 298-18-0), *D*-1,2:3,4-diepoxybutane (30419-67-1), *L*-1,2:3,4-diepoxybutane (30031-64-2), and *meso*-1,2:3,4-diepoxybutane (564-00-1).

USE

Diepoxybutane is not produced commercially in the U.S. except in small quantities for research. It may be used as a curing agent for polymers; as a cross-linking agent for textile fabrics; as a chemical intermediate in paper and textiles; and in preventing microbial spoilage (HSDB 2000, NTP 2001). Mixed stereoisomers and individual isomers of diepoxybutane have been used to synthesize erythritol and other pharmaceuticals (IARC 1976).

PRODUCTION

Diepoxybutane has not been produced commercially in the United States since 1978 (SRI 1978, HSDB 2000); however, six U.S. suppliers were identified (Chem Sources 2001). The 1979 TSCA Inventory indicated that 500 lb of diepoxybutane (isomeric forms not specified) were imported by one company in 1977 (TSCA 1979). No export data were available.

EXPOSURE

The primary routes of potential human exposure to diepoxybutane are inhalation and dermal contact. Potential occupational exposure to residues of diepoxybutane occurred during the manufacture of fabrics, pharmaceuticals, and polymers and during the use of the compound in research. A risk of exposure also existed for workers and health professionals involved in the formulation, packaging, and administration of pharmaceuticals synthesized from diepoxybutane. The National Occupational Exposure Survey, conducted by NIOSH from 1981 to 1983, and the National Occupational Hazard Survey, conducted by NIOSH from 1972 to 1974, made no estimate of possible worker exposure to the chemical. Use of diepoxybutane in consumer products is not known. Possible consumer exposure to residues of diepoxybutane may have occurred through use of textiles or related polymer products containing it. No environmental releases of diepoxybutane were listed in EPA's Toxic Release Inventory (TRI) between 1988 and 1999. One facility reported treating 11,600 lb of diepoxybutane waste in 1999 compared to 136,000 lb in 1991 (TRI99 2001).

REGULATIONS

EPA regulates diepoxybutane under the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Superfund Amendments and Reauthorization Act (SARA), and Toxic Substances Control Act (TSCA). Under TSCA, EPA requires manufacturers of diepoxybutane to provide detailed production and marketing data and health and safety data requirements. Under RCRA, EPA designates diepoxybutane as a hazardous constituent of waste. Under CERCLA, EPA has established a reportable quantity (RQ) of 10 lb (4.54 kg), and under SARA, has established notification and reporting requirements.

OSHA regulates diepoxybutane under the Hazard Communication Standard and as a chemical hazard in laboratories. Regulations are summarized in Volume II, Table 68.

REFERENCES

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HSDB. Hazardous Substances Data Bank. Online database produced by the National Library of Medicine. 1,2:3,4-Diepoxybutane. Profile last updated, February 11, 2000. Last review date, February 6, 1991.

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Diepoxybutane (Continued)

NTP. National Toxicology Program. NTP Chemical Repository. D,L-1,2:3,4-Diepoxybutane. Last updated August 13, 2001. (<http://ntp-server.niehs.nih.gov> and search 298-18-0).

SRI. Chemical Economics Handbook. Stanford Research Institute, Menlo Park, CA: SRI International, 1978.

TRI99. Toxic Chemical Release Inventory 1999. Data contained in the Toxic Chemical Release Inventory (TRI). Available from the U.S. Environmental Protection Agency Office of Environmental Information, <http://www.epa.gov/triexplorer/reports.htm>, 2001.

TSCA. Toxic Substances Control Act, Chemical Substance Inventory, 1979: public record.